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this a geometric construction was given. The constructions involve the ruler alone, as is proper when a single point is to be found.

Prof. Alexander S. Chessin, of the Johns Hopkins University, gave a brief account of his investigations on the motion of a physical pendulum, taking into account the rotation of the earth about its axis. He showed that when the relative velocity of the pendulum is zero, as in the famous experiment of Foucault, the motion of the axis of the pendulum can be represented as composed of two simultaneous motions: (1) of the motion on a very flat closed conic surface, this surface having a plane of symmetry which would be the plane of oscillations of the pendulum, but for the disturbance due to the rotation of the earth; and (2) of the rotation of this conic surface about the vertical of the point of suspension.\* The conic surface being very flat, it will seem to an observer as if the axis of the pendulum oscillated in the plane of the vertical of the point of suspension, while at the same time this *apparent* plane of oscillations rotated about the vertical. In Foucault's experiment the rotation of the apparent plane of oscillations took place *clock-wise*. Prof. Chessin showed that this rotation depended on the construction of the pendulum; namely, if the pendulum be properly constructed and the amplitude of oscillations be sufficiently great, then the rotation of the apparent plane of oscillations could take place as well *clock-wise* as *contra clock-wise* or even *not take place at all*. This interesting phenomenon could be observed best at places near the equator, because the angular velocity of rotation of the apparent plane of oscillations is composed of two terms, one proportional to the *sin*, the other

to the *cos* of the latitude of the place of observation. The contra clock-wise rotation is due to the presence of the cosine term and is maximum on the equator. In concluding, Prof. Chessin emphatically urged experiments which would verify his calculations.

Prof. E. W. Brown, of Haverford College, made a brief statement of the progress of his calculation of the solar inequalities in the lunar theory. The motion of the node was compared with Hansen's result and with that given by observation. An explanation was also given of the slow convergence of the series which represents the principal part of the secular acceleration of the moon's mean motion.

Following a pleasant custom of previous years, several of the members dined together after the meeting.

F. N. COLE,

*Secretary.*

#### CURRENT NOTES ON ANTHROPOLOGY.

##### DIVINATORY AND CALENDRIAL DIAGRAMS.

At the American folk-lore meeting Mr. Stewart Culin exhibited and explained several divinatory diagrams from Thibet, China and Corea, and called attention to their close similarity to the so-called 'calendar-wheels' and the *tonalamatl*, or book of days, of ancient Mexico. He pointed out that the fundamental conceptions of both are identical, and that both developed into games, such as *parcheesi* in India and *patolli* in Mexico, the Chinese game of 'promotion,' and the European 'game of goose.'

These all begin with the numerical concept of the four, expressed in four arms, like a cross, or four 'houses' or squares, which latter, by multiplication, may be 12, 16, 64, etc. This primary concept expressed the original notion of the 'four quarters,' *i. e.*, of the world, and, by extension of the cosmos, time as well as space. The relation of each individual to the All was the notion which imparted the divina-

\* See *American Journal of Mathematics*, Vol. XVII., p. 86; Johns Hopkins University Circulars, Vol. XIV., No. 118, p. 64.

tory character to the diagram, and was as common in Central America, where it gave rise to the sacred 'year' of 260 days, as in many parts of the Old World. Such calendars were not originally time-measurers, but divining schemes, as Sahagun expressly states.

#### THE RACIAL GEOGRAPHY OF EUROPE.

THE complex and historically important subject of the geographical distribution of racial types in Europe has been closely studied by Prof. W. Z. Ripley, and will be made the theme of a series of articles in the *Popular Science Monthly*, beginning with the February number. The articles will be amply illustrated by maps, diagrams and some fifty hitherto unpublished portraits of race types reproduced from original photographs. Having had the advantage of looking through Prof. Ripley's collections upon this branch of anthropology, I feel sure his articles will add much new material and many valuable suggestions to a comprehension of the racial questions of modern Europe. Such points as the cephalic indices, the distribution of blonds and brunettes, the comparison of stature and weight, etc., when studied from hundreds of thousands of individual measurements, must lead to results more secure, and perhaps quite differing from those hitherto published.

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#### NOTES ON INORGANIC CHEMISTRY.

IN the last number of the *Chemical News*, Prof. John Waddell, of the Canadian Royal Military College, describes a large number of experiments on the permeability of various elements to the Röntgen rays. He concludes "that the elements may be divided into two classes, those of low atomic weight and those of higher atomic weight, the transition taking place between the atomic weights of 30 and 40. Among the

higher elements the opacity is probably not far from being proportional to density, but with elements of low atomic weight the same law does not hold; sodium, for instance, is decidedly more permeable than aluminum; lithium and sodium are more nearly alike. Metals and non-metals cannot be differentiated from each other; boron is less permeable than sodium, and sodium is less permeable than oxygen."

THE cause of poisoning from wall papers containing arsenic has often been ascribed to the formation of arsin (arsenated hydrogen) by the action of mould on the paper. An account is given in the last *Berichte* of a number of experiments carried out by O. Emmerling bearing on this subject. Several different kinds of bacteria were grown in cultures containing arsenic, and in no case was arsin present in the gases evolved. The same was true when several different species of moulds were used. A moist arsenical paper was exposed in a tube in a current of air till it had on it numerous colonies of moulds, yeasts and bacteria. The air was drawn through a silver nitrate solution and no trace of arsin was present. Hence it would seem that danger from arsenical wall papers is not from the formation of arsin, but from particles of dust given off from the paper. Happily, few wall papers are at present manufactured containing arsenic.

IN a letter to *Nature* (Nov. 26), on the subject of osmotic pressure and ionic dissociation, Prof. Henry E. Armstrong uses these words: "There can be no doubt that in so far as *weak solutions* are concerned, a law has been discovered which is broadly true *in mathematical form*; yet I have no hesitation in asserting that the fundamental premises on which it is based are destitute of common sense, in the opinion of those who look at these matters without leaving chemical experience out of ac-